

Exercise 1 When studying trigonometry, you will learn that both \sin and \cos are periodic functions with period 2π .

Many functions that can be built out of \sin and \cos are also periodic. In this exercise, we'll use Desmos to explore how the period can change.

- (a) Consider the function f defined by $f(x) = \sin(3x)$. For reference, here is a graph of f on Desmos:

Desmos link: <https://www.desmos.com/calculator/uc3meehtpv>

The period of f is

Multiple Choice:

- (i) π .
- (ii) 2π .
- (iii) 3π .
- (iv) 6π .
- (v) $\frac{\pi}{2}$.
- (vi) $\frac{2\pi}{3}$. ✓

- (b) Consider the function g defined by $g(x) = \cos\left(\frac{x}{3}\right)$. For reference, here is a graph of g on Desmos:

Desmos link: <https://www.desmos.com/calculator/364oqkoauu>

The period of g is

Multiple Choice:

- (i) π .
- (ii) 2π .
- (iii) 3π .
- (iv) 6π . ✓
- (v) $\frac{\pi}{2}$.
- (vi) $\frac{2\pi}{3}$.

- (c) Consider the function h defined by $h(x) = \sin(2x - \pi)$. For reference, here is a graph of h on Desmos:

Desmos link: <https://www.desmos.com/calculator/wha8ccbi93>

The period of h is

Multiple Choice:

- (i) π . ✓
 - (ii) 2π .
 - (iii) 3π .
 - (iv) 6π .
 - (v) $\frac{\pi}{2}$.
 - (vi) $\frac{2\pi}{3}$.
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